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## THE LEPIDOPTEROUS GENUS NOBILIA (GEOMETRIDAE SUBFAM. STERRHINAE).

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FROM the year 1897, when Warren described his *nebulosa* and *obliterata*, until 1922, when Lord Rothschild (*Proc. Ent. Soc. Lond.* 1922, p. cxxxii) commented on the wide divergences in the genitalia of the forms passing as *turbata* Walk., very little attention appears to have been paid to the genus *Nobilia* Walk. It was tacitly assumed that there were four species, and four only; a brief note which I published in 1917 (*Nov. Zool.* xxiv, p. 307) is, so far as I am aware, the only intermediate reference in the literature, and this pays no attention to the morphology.

Naturally Lord Rothschild's observations excited my interest and a desire to subject the so-called *turbata* forms to a more searching analysis; but until a few months ago my preoccupation with other studies equally or still more urgent has frustrated my intentions. Now that I have carried them out, I take the opportunity to offer a revision of this small but interesting genus. I have to acknowledge with gratitude the ready help of Mr. W. H. T. Tams in making preparations of the genitalia of a number of specimens in the British Museum.

*Nobilia* Walk. (*List Lep. Ins.* xxiv, p. 1098, 1862), which is clearly one of the outliers of *Scopula* (*Acidaliinae* of Pierce), was treated by Hampson in his "Fauna of British India, Moths," as Sect. II B of *Somatina*, another outlier of the same group. His sectional characterization (iii, p. 465) runs: "Hind tibia of male shortened, and with the tuft from its base short; the first joint of tarsus long, dilated, and with a fold containing a tuft of hair." The genus *Somatina* itself is distinguished in the Key to the Genera of the "Acidaliinae" [Sterrhinae] in the same work by the non-elongate terminal joint of palpus, origin of vein 5 of both wings before the middle of the discocellulars, double areole of forewing and non-stalking of veins 6 and 7 of hindwing. This classification affords a good frame-work, but leaves *Somatina* as a sort of supergenus, of almost world-wide distribution and susceptible of much further subdivision.

The principal characters of *Nobilia* are the following. Palpus with 2nd joint extending somewhat beyond the face, with densely compact scaling, 3rd joint in ♂ short; ♀ with both these joints slightly longer than in ♂. Antenna of ♂ with dense fascicles of long cilia, usually arising from small triangular teeth; intermediate fascicles much shorter and slighter. Antenna of ♀ minutely ciliate. Hindtibia of ♂ short and broad, spurless, with a dense hair-tuft from femoro-

tibial joint, hindtarsus of ♂ with 1st joint densely tufted; ♀ with 4 spurs. Forewing with apex pointed, termen smooth, rather straight anteriorly, more curved posteriorly; cell rather less than  $\frac{1}{2}$ , DC<sup>2</sup> short, DC<sup>3</sup> curved anteriorly (often rather sharply); areole double, with SC<sup>2</sup> arising from stalk of SC<sup>3-5</sup>, R<sup>2</sup> rather extremely placed, M<sup>1</sup> well separate. Hindwing with termen slightly waved, bent (sometimes slightly toothed) at R<sup>3</sup>, tornus well expressed; cell rather short ( $\frac{2}{5}$  or less); C anastomosing with cell, usually at slightly more than a point, or at first not rapidly diverging, SC<sup>2</sup> about connate, or quite shortly stalked, R<sup>2</sup> scarcely before middle of DC, M<sup>1</sup> separate. Genitalia of ♂ complicated, highly fused, more or less asymmetrical; uncus slight or obsolete, socii developed, valves specialized into strongly chitinized arms, dorsal and ventral, 8th sternite with an irregular plate, aedoeagus strongly chitinized. Apart from the genitalia, *Nobililia* differs from *Somatina* in shape and facies, more extreme position of R<sup>2</sup> of the forewing, details of hindleg structure, etc.; from most of the allies (*Craspediopsis*, *Orthoserica*, *Lissolemma*, *Ignobililia*) also in the non-pectinate ♂ antenna, *Craspediopsis*, which is nearest to it in R<sup>2</sup> and in the angled hindwing, is farthest away in the scaling and pattern and is, according to these criteria, as well as the genitalia, much nearer to *Scopula*.

#### KEY TO THE SPECIES.

- |  |    |                          |
|--|----|--------------------------|
| 1. Wings beneath not more ochreous than above . . . . .  | 2  |                          |
| Wings beneath bright ochreous . . . . .  | 3  |                          |
| 2. Wings above without white subterminal line . . . . .  | 1. | <i>obliterata</i> Warr.  |
| Wings above with white subterminal line . . . . .  | 2. | <i>cupreata</i> Pagenst. |
| 3. Forewing with median area concolorous with costal . . . . .   | 4  |                          |
| Forewing with median area concolorous with distal . . . . .  | 7. | <i>strigata</i> Warr.    |
| 4. Prevailing tone cinnamon to hazel; ♂ socii approximated . . . . .   | 3. | sp.n. (India).           |
| Prevailing tone darker; ♂ socii remote . . . . .   | 5  |                          |
| 5. Larger (48 mm.), rather brighter, aedoeagus large . . . . .   | 5. | sp.n. (Celebes).         |
| Smaller, generally darker, aedoeagus normal . . . . .  | 6  |                          |
| 6. Hindwing scarcely toothed at R <sup>3</sup> ; left socius not conspicuously the larger; Malayan . . . . . | 4. | <i>turbata</i> Walk.     |
| Hindwing well toothed at R <sup>3</sup> ; left socius conspicuously the larger; Papuan . . . . .             | 6. | sp.n.                    |

#### 1. *Nobililia obliterata* Warr.

*Nobililia obliterata* Warr., *Nov. Zool.* iv. 220 (1897) (Borneo).

The simplest species in markings. Forewing with apex scarcely at all produced, termen scarcely waved, the hindwing with the bend at R<sup>3</sup> weak, the termen very little waved. Rather uniform pinkish cinnamon (nearly 15" c of Ridgway), with very fine, almost regularly spaced whitish strigulae; costal edge of forewing dark, not succeeded by the pale or drab area which characterizes all the other species except *cupreata*; the wings otherwise marked nearly alike, with black cell-dot (that of forewing minute), faint pinkish cinnamon median shade, and fine, sinuous greyish postmedian, somewhat accentuated by blacker teeth outward on the veins. Underside slightly more pinkish, smooth and uniform, only with posterior region pale.

Genitalia of ♂: posterior edge of dorsal plate even less prominent centrally than in No. 3; socii approximated, rather long, the left very decidedly longer than the right, down-curved, valve with the dorsal arm considerably longer than the ventral; ventral plate posteriorly with two broad lobes, somewhat asymmetrical, but lacking the projecting thorn of No. 3.

Borneo and Perak.

## 2. *Nobilia cupreata* (Pagenst.).

*Plutodes cupreata* Pagenst., *J. B. Nass. Ver. Nat.* xli. 178 (1888) (Amboina).

*Nobilis nebulosa* Warr., *Nov. Zool.* iv. 58 (1897) (Amboina).

In shape and colour rather similar to *obliterata*. Hindwing with the bend at R<sup>3</sup> still slighter. Forewing with costal edge less darkened, except at the base, the succeeding area with a suggestion of the pale streak of the rest of the species; cell-spot small and weak; proximal and distal areas—the latter also on hindwing—suffused with a slightly deeper, more coppery shade; both wings with a fine white subterminal line, slightly nearer termen than in *turbata*, some bluish-white admixture beyond it; cell-mark of hindwing nearly as in *turbata*. Underside as in *obliterata*.

Genitalia of ♂: distinguishable at once from all the others by having the dorsal plate produced centrally into a long, fine (pseudo-)uncus; socii remote; plate of 8th sternite with posterior arms long and slender, almost symmetrical. (Examination without dissection.)

Amboina.

This must be a rare species. I have seen only Warren's type ♂, while Pagenstecher also described from a single ♂. Excepting the implications involved in his entirely erroneous generic location, the description by the latter author is good; no doubt Warren's failure to recognize it and his consequent creation of a synonym are attributable to this erroneous location.

## 3. *Nobilia avellanea* sp.n.

♂♀, 42–45 mm. Closely similar to *turbata*, but distinguishable by the tone of colour and nearly always by the postmedian line of the forewing. Very pale buff, very closely strigulated and reticulated with orange-cinnamon (general aspect vinaceous-cinnamon to hazel), admixture of dark scaling slight.—*Forewing* with posterior patch rather broad, cut off rather suddenly at M, reappearing as a small spot or triangle in cell near the discal lunule; discal lunule not broad, almost always well separated from postmedian line; postmedian forming an acute angle at M<sup>2</sup>; extreme terminal area, excepting the costal streak, concolorous with rest of extra-postmedian region.—*Hindwing* with extreme distal area almost concolorous with the rest at least to behind R<sup>2</sup>.—Underside orange-buff or slightly deeper, the forewing suffused with flesh-ochre about the fold and narrowly at costa and termen.

Genitalia of ♂: Socii approximated, almost parallel, fairly long, straightish, only slightly asymmetrical. Valves (as in all the examined *Nobilis*) small, highly chitinous, apparently rather strongly fused to the anellus; costal arm slender, curved, ventral arm long, strong, arising from the innerside of the "sacculus." Plate of 8th sternite remarkably asymmetrical, its posterior edge quite irregularly tapering, not two-armed, a strong rose-thorn-shaped prong rising from its left-hand side near the end.

N. India : Darjiling and Assam, the type ♂ from Cherrapunji in coll. Tring Mus. Also known from Burma, Tonkin, Selangor, Penang, Singapore, Sumatra (Korintji) and Borneo.

This is the "Indian" *Nobilis* of Rothschild (*loc. cit.*) and is certainly commoner there than elsewhere, but its range overlaps with that of *turbata*.

#### 4. *Nobilis turbata* Walk.

*Nobilis turbata* Walk., *List Lep. Ins.* xxiv. 1098 (1862) (Sarawak).

*Plutodes strigularia* Snell. in Veth, *Midden-Sumatra* iv. : 1 (2) 57 (1880) (Central Sumatra).

*Plutodes (Omiza) strigularia* Pagenst., *Jahrb. Nass. Ver. Nat.* xli. 178 (1888).

*Somatina turbata* Hmps. (part.), *Faun. Ind. Moths*, iii. 465 (1895).

Walnut brown largely suffused with Hay's brown, the general tone inclining to cameo brown or chocolate.—*Forewing* with posterior patch behind M generally less broad than in *avellanea*, not broken except by M itself, but with its continuation in front thereof more isabelline or light brownish olive, the dark spot near cell-mark wanting or reduced to a dot ; cell-mark rather broad, somewhat reniform, its hinder edge commonly touching the postmedian ; postmedian less acutely angled at M<sup>2</sup> than in *avellanea* ; extreme terminal area generally paler, at least posteriorly.—*Hindwing* with extreme distal border almost concolorous with the rest at apex, but soon (at least from cellule 6) becoming pale.—Underside with the flesh-ochre suffusions broader than in *avellanea*.

Genitalia of ♂ : "Socii" extremely sundered (forming terminal processes to the lateral flanges of the 10th tergite), asymmetrically curved, the right short, the left less so ; valve with costal arm much more highly developed than in *avellanea*, though still slender, ventral arm rather shorter than costal, broader. Plate of 8th sternite with long arms anteriorly (*i.e.* cephalad), also strongly emarginate posteriorly, though here with the arms less long than in No. 2 and No. 6.

E. Pegu, Tenasserim, Malay Peninsula, Sumatra, Java, Borneo and Mindanao.

By the genitalia, there will almost certainly be some differentiable races, but more material and more study will be required before they can be established ; the more striking thing, and the first to demonstrate, is the general homogeneity, together with the great structural difference from *avellanea*. This (*turbata vera*) is the "Malayan" *Nobilis* of Rothschild, *loc. cit.*

It should be added that the discovery that the two closely similar species occur on Sumatra has raised some doubts as to my earlier synonymy, here provisionally retained. Snellen's type, a ♂ from Silago, was described as "rust-brown," which would rather speak for *avellanea*, but the "narrow" grey median area and the confluence of the cell-mark with the distal area would favour *turbata* and it is obviously better, until the type can be studied, to keep the name sunk than to resuscitate it hazardingly for the preceding species.

#### 5. *Nobilis erotica* sp.n.

♂, 48 mm. Larger than the other species, more cinnamon than in most *turbata*, though more dark-mixed than *avellanea*, some of the pale strigulae on the outer area of the forewing apparently stronger than in any other *Nobilis*.—*Forewing* with postmedian line almost as acutely angled as in *avellanea*, the discal



lunule similarly removed from it.—*Hindwing* with termen apparently slightly more crenulate than in *turbata*; terminal area between the radials more clouded with the ground-colour than in typical *turbata*.

Genitalia of ♂: similar to those of *turbata*; anal cone (in dried specimen) so strong as to be easily mistaken for an uncus; "socii" nearly symmetrical, decumbent, rather slender and recurved, their edges appreciably serrate; plate of 8th sternite less deeply emarginate at posterior edge than in *turbata*; costal arm of valve strong, strongly curved; aedoeagus much stouter than in the other species.

Celebes: Tondano (Weigall), 1 ♂ in Mus. Tring (unfortunately worn, especially the right wings).

### 6. *Nobilia aphrodite* sp.n.

♂♀, 42–48 mm. Very variable, sometimes extremely similar to *turbata*, though distinguishable by the shape of the hindwing. The pale parts nearly always with a more decided tinge of brown, the hindwing very generally with an appreciably pale band between the median and postmedian lines, though this is never so clear as the corresponding part of the forewing.—*Forewing* with the cell-spot and often the postmedian line more as in *avellanea* than in *turbata*, the terminal area as in *turbata* or on an average even paler; the dark parts in the ♂ commonly more clouded with black than in *turbata*, in the less clouded forms with the brown seen to be slightly less reddish; ♀ more cinnamon, occasionally even much like *avellanea*.—*Hindwing* termen with well-defined tooth at  $R^3$ ; terminal pale admixture generally as in *turbata*.

Genitalia of ♂: Dorsal plate (9th tergite) produced to an almost uncus-like point (though less acute and much less long than that of *cupreata*); "socii" widely sundered, the left-hand one the larger and less decumbent; plate of 8th sternite almost H-shaped in the length of the arms both anteriorly and posteriorly. Valve with the arms not very unequal, perhaps more so in thickness than in length, the ventral broad and fairly long.

New Guinea, the type from Upper Aroa River in Mus. Tring; also from Ron, the d'Entrecasteaux, Dampier, Vulcan and apparently throughout the Bismarck Archipelago.

A rather striking aberration, which may possibly prove a separate species, has the wings strongly suffused with violet-grey.

### 7. *Nobilia strigata* Warr.

*Nobilia strigata* Warr., Nov. Zool. iii, 112 (1896) (Borneo).

In its purplish colour very distinct from all the other species, nearest to the colour of the last-mentioned aberration, but much more freckled and with the median and terminal areas of the forewing scarcely any paler than the rest.—*Forewing* with broad pale costal streak, otherwise not strongly marked, the scheme as in the *turbata* group, but with the postmedian broad and sinuous, the pale subterminal weak or subobsolete; discal lunule moderate.—*Hindwing* with termen rather strongly toothed at  $R^3$ , apex slightly less pronounced than in the *turbata* group; almost unicolorous, except for the white, black-tipped cell-mark and the rather weak postmedian.

Genitalia of ♂: Dorsal plate with posterior edge not very convex; left "socius" produced into a slender downward-curved claw. Plate of 8th sternite elongate, roughly parallel-sided, irregularly and asymmetrically tapered posteriorly, but not two-pronged, a rose-thorn-shaped process rising from its right-hand side near the end, preceded anteriorly on the same edge by some small serration. Valves fairly similar to those of *turbata*.

Borneo, the Malay Peninsula and S. Java, apparently pretty constant.

It is a curious coincidence, though it would be rash to give it any special significance, that the two otherwise very dissimilar species *avellanea* and *strigata* should have a very similar "rose-thorn" on the plate of the 8th sternite, in the one case on the left side, in the other on the right.

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